# 5. IMPLEMENTATION, PHASING AND COST

## Options

The options outlined in Chapter 3 have been analyzed with the following criteria in mind:

a. Width available in the railroad right-of-way;
b. Impacts on landholders' ability to utilize their property;
c. Functionality for users;
d. Environmental impacts;
e. Integration into existing bikeway routes; and
f. Minimization of new railroad-trail crossings.

Overall, it is clear that Option 1: RWT works best in terms of trail implementation. It is recommended that the path be constructed on the northwest side of the railroad from the Charles River to Main Street. Placing the path on the northwest side of the railroad provides for enhanced access to the path from Cambridgeport and prevents conflicts with use of the railroad siding on the southwest side of the main line. This design also prevents interference with access to MIT buildings east of Massachusetts Avenue including the institute's power plant. For the most part east of the Memorial Drive Bridge, the path would be set back from the railroad centerline by 20 feet and would not directly impact any existing buildings or have significant negative effects on the use of adjoining property. The path would impact some surface parking spaces and a mechanical unit on MIT property within the corridor. The setback distance would vary from the standard 20 feet at the northern end approach to Cambridge Street and under Memorial Drive at the southern end.

North of Main Street, the path would primarily be located on lands formerly owned by the railroad but now owned by abutters including: Cambridge Redevelopment Authority (CRA), Spaulding and Slye, Linden Park Homes, the Archdiocese of Boston, and the Cambridge Housing Authority.

Option 2, the construction of both the one-way Bus Rapid Transit (BRT) and the trail in the Grand Junction corridor would be more difficult. The ideal cross-section for the corridor to accommodate all three uses - trail, BRT, and railroad – would be to have the path along the northern edge of the corridor next to the BRT, and the railroad along the southern edge. While this alignment would

require moving some of the CSX siding, it is still feasible and would be the option that would permit all uses to remain in the corridor.

## Phasing Strategy

To maximize the ability of the City of Cambridge to build the Grand Junction Trail, a phasing strategy process, along with the creation of a special overlay district, is proposed (see Figure 5-1 on page 5-3). The creation of a zoning overlay district could be implemented immediately. The special district would preserve the potential of the corridor to serve as a multipurpose transportation route. Land could still be sold to private parties, but development would be prohibited within the corridor. Any development potential (in terms of floor area or parking spaces, for instance) would have to be used on portions of lots outside the corridor; the land within the corridor, however, could be used to meet setback or open space requirements. A similar Pathway Overlay District was created in western Cambridge in 2006.

Following the implementation of a zoning overlay district, the City can approach the construction of the trail in phases based on ease of construction, ownership issues, coordination required with CSX, physical constraints, and other issues. One phasing strategy is outlined below:

Stage 1: Main Street to Binney Street – Owned by CRA, no conflicts or issues with MIT or CSX.

Stage 2: Binney Street to Gore Street – Some private property ownership, ECAPS support, City should be able to assemble the land, does involve CSX property.

Stage 3: Memorial Drive to Main Street – Requires cooperation with MIT.

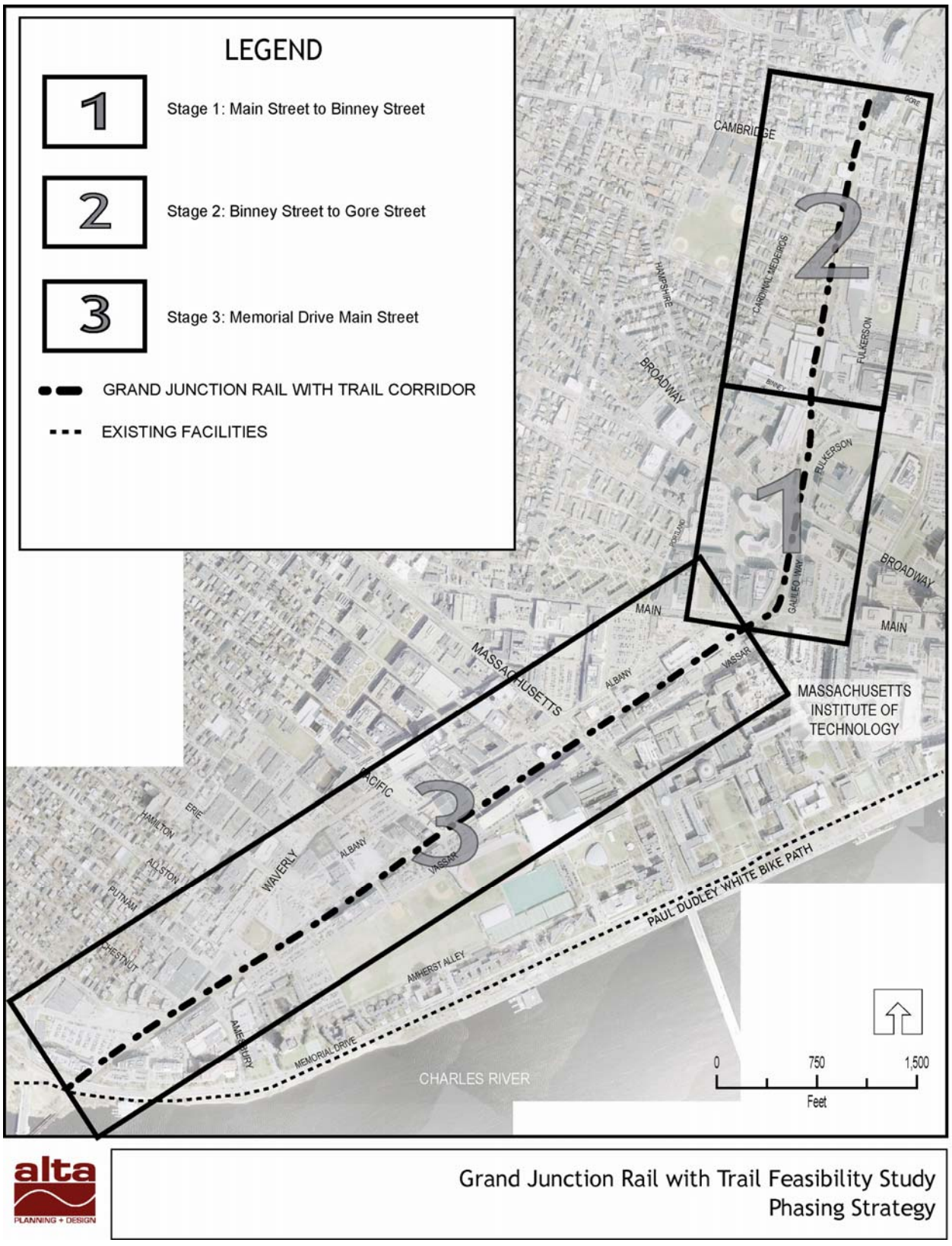


Figure 5-1. Phasing Strategy Map

# Issues to Overcome

Clearly, there are many issues that would need to be overcome to fulfill these recommendations. Table 5-1 outlines starting point strategies for each of these, with the understanding that more detail should emerge as the project goes forward.

Table 5-1. Starting Point Issues and Strategies

| Issue | Strategy |
|---|---|
| Working with MIT as a major land owner of the corridor | Work with MIT regarding liability and access to the corridor as early as possible. |
| Working with CSX as the main rail operator and major land owner in the corridor | Work with CSX regarding liability and access to their railroad tracks for maintenance.<br>Highlight the benefits of the corridor to CSX |
| Acquire the rights to build the path along private property from both large landowners as well as the sliver properties in the northern section of the proposed trail | Meet with various landowners to discuss easements and licenses (see Chapter 4: Legislation, Liability and Insurance).<br>Highlight the benefits gained for the landowners from the creation of the Grand Junction Trail. |
| Improve trail-street intersections and track crossings | Place bollards[8] and trail signs at all street/trail intersections so that trail users and drivers recognize the change in environment.<br>Improve track crossings where necessary by adding signage, lights, and rubber flanges to the track to reduce the track width and improve the crossing for bicyclists. |
| Research potential public safety issues of creating a multi-use path adjacent to MIT's nuclear reactor | More research is necessary. |
| Create a successful management team and program for the trail | Requires a good working relationship with the other major property owners (specifically MIT and CSX) to create a management program that will satisfy the needs and requirements of all parties. |
| Connect Cambridgeport residents to the Paul Dudley White Bikepath | Improve the connection across the railroad track in at Ft. Washington to increase connectivity for the Cambridgeport residents. |
| Create a safe connection at Main Street to connect the on-street portion of the trail with the Grand Junction corridor portion of the trail | Ensure that the crosswalks and signals located at the intersection of Vassar and Main Street are sufficient for the numbers of potential users that will be crossing over to the west side of the intersection to continue north on the Grand Junction Trail. |

[8] Bollards can be very effective when used and installed properly. Two permanent bollards at the trail's edge and one removable bollard in the center of the trail serves to keep all but the most determined vehicle traffic off the trail. Maintenance vehicles and emergency vehicles are equipped to remove the center bollard to gain full access to the trail and corridor. From a trail user perspective, bollards serve as a visual warning that they are approaching an intersection and care is required. Bollards need to be brightly painted to prevent trail users from crashing into them, particularly at night. The width and spacing of the bollards is important relative to the width of the trail itself. There needs to be sufficient room on either side of the bollard for a bike with a trailer to pass successfully without leaving the trail.

# Cost

The overall cost of the trail includes several components:

- Trail construction cost (including fencing and trail/roadway intersection improvements)
- Trail design cost
- Acquisition of land takings, easements, or licenses

Table 5-2 provides a breakdown of the trail construction costs using a combination of MassHighway Weighted Average Bid Prices (2004) and recent bids for construction contracts in the City of Cambridge for two different options. The cost includes clearing an 18-foot wide area for trail development. A 12-foot wide area would be excavated to a depth of 6 to 8 inches with the material spread to the sides of the path. The trail would be 12 feet wide with a structure consisting of a 10-inch gravel base and a 2.5-inch asphalt surface course. The shoulders would be 3 feet wide with 3 inches of loam over the spread excavated material. No existing material would be removed from the site.

A design cost of 10% of the total construction cost and a construction oversight cost of 10% of the total construction cost has been assumed for purposes of showing an overall cost for the design and construction of this project. A construction contingency of 40% has also been included. This contingency is used to accommodate unforeseen conditions that arise during detailed design as well as construction. Because of the complexity of the corridor involved, it is recommended that a thorough, itemized design fee be developed once a concept has been chosen to provide a more accurate cost.

Costs related to land takings, easements, or licenses are not included in this estimate and would be developed at such time as the trail development moves forward. Appendix A includes the detailed design and construction costs, including all assumptions and calculations.

Table 5-2. Summary of Opinion of Probable Construction and Design Costs

| Segment No. and Location | | Length of Trail | Option 1 Total Cost | Option 2 Total Cost |
|---|---|---|---|---|
| A | Memorial Drive/Brookline Street Intersection to Massachusetts Avenue | 4560 | $ 3,053,385 | $ 6,623,735 |
| B | Massachusetts Avenue to Main Street | 1425 | $ 1,441,663 | $ 2,755,835 |
| C | Main Street to Broadway | 740 | $ 600,243 | $ 600,243 |
| D | Broadway to Binney Street | 730 | $ 505,980 | $ 981,346 |
| E | Binney Street to Cambridge Street | 1810 | $ 1,416,836 | $ 3,032,597 |
| F | Cambridge Street to Gore Street | 510 | $ 847,784 | $ 1,701,574 |
| | **GRAND TOTAL** | **9775 LF** | **$ 7,865,892** | **$ 15,695,330** |